Binational Case Reports
Along the US-Mexico Border
Arizona, 2012

Goals of Binational Case Reporting

- To provide timely information to appropriate public health partners on both sides of the U.S.- Mexico border to enable to investigations of infectious disease reports
- To strengthen communication between local, federal, and binational partners for preparedness strategies as well as outbreak responses
- To better understand the geographical spread and impact of infectious diseases along the Arizona-Sonora border region

Methods for Reporting

In Arizona, notification of binational cases is managed in MEDSIS, (Medical Electronic Disease Surveillance Intelligence System) which is an electronic system to help control infectious diseases. Health care providers use MEDSIS to report cases while cases identified through laboratory results are either put in manually by county health departments, or reported to a separate electronic system, Electronic Laboratory Reporting (ELR), which is linked with MEDSIS. The Border Infectious Disease Surveillance (BIDS) Program relies on local health departments to flag the case as binational, as well as to perform further investigations of these cases. Additionally, BIDS runs a report of all possible binational cases in MEDSIS searching for cases with Mexican residency and/or cases that have Mexico keywords in appropriate text fields. Sonora public health professionals have access to MEDSIS which facilitates the exchange of information on binational cases.

Binational Case Definition:

Is defined as any individual with a confirmed, probable, or suspect case of a notifiable infectious disease, and:

1. Has recently travelled or lived in Mexico, or had recent contact with persons who lived or traveled in Mexico; or
2. Is thought to have acquired the infection in Mexico or has been in Mexico during the incubation period of the infection and was possibly contagious during this period; or
3. Is thought to have acquired the infection from a product from Mexico; or
4. May require the collaboration of public health agencies in both Mexico and the United States for the purposes of disease investigation and control.

Confirmed, probable, and suspect cases of Arizona reportable conditions:

- This report contains primarily confirmed and probable cases of reportable conditions in Arizona; however, all binational cases ruled as 'suspect' (n=9) are included in these analyses unless specified otherwise.
- In 2012, MEDSIS did not collect data on cases of Tuberculosis, HIV/AIDS, or other Sexually Transmitted Infections even though these were and continue to be notifiable diseases in Arizona. Therefore, binational cases that fall into these categories were not reported to Border Health in 2012 and are not represented in this report.

For more information on reporting pathways of these binational cases, please reference Appendix A (p.8). Descriptive statistics are presented throughout this report on all of Arizona's binational cases reported in 2012 (p.2 - p.7). Additional exploratory analyses and comparisons can be found in Appendix B (p.9 - p.11).

Table 1: 2012 Arizona Binational Cases by Disease Category, Disease, and Subtype* (N=172)

Disease Category	Disease	Cases (N)	Subtype	Cases (N)
Aseptic Meningitis (N=3)	Aseptic Meningitis, viral	3		
Febrile Exanthem (N=7)	Mumps	1		
	Varicella (chickenpox)	6		
Foodborne/Waterborne (N=109)	Campylobacteriosis	36	*C. jejuni* *Not Serotyped*	*18* *18*
	E. Coli (Shiga Toxin)	10	*O157:H7* *Not Serotyped*	*1* *9*
	Listeriosis	1		
	Salmonellosis	27	*Agona* *Altona* *Anatum* *Berta* *Enteritidis* *Heidelberg* *Javiana* *Kentucky* *Kiambu* *Montevideo* *Muenchen* *Newport* *Oranienburg* *Panama* *San Diego* *Typhimurium* *Not Serotyped*	*1* *1* *2* *1* *3* *1* *1* *1* *1* *1* *1* *3* *3* *2* *1* *2* *2*
	Shigellosis	30	*Group B Flexneri* *Group C Boydii* *Group D Sonnei* *Not Serotyped*	*5* *1* *8* *16*
	Typhoid Fever *(Salmonella Typhi)*	1		
	Vibrio Infection	4	*Parahaemolyticus* *Not Serotyped*	*3* *1*
Fungal (N=1)	Coccidioidomycosis	1		
Hepatitis (N=33)	Hepatitis A	32		
	Hepatitis C	1		
Parasitic (N=8)	Amebiasis	2		
	Chagas Disease	1		
	Giardiasis	4	*Lamblia* *Not Serotyped*	2 2
	Malaria *(P. Falciparum)*	1		
Respiratory (N=6)	*Legionella pneumophila*	3		
	Pertussis	2		
	RSV (unsubtyped)	1		
Vector-borne and Zoonotic (N=5)	Brucellosis	3	*B. Melitensis* *Not Serotyped*	2 1
	Dengue (unsubtyped)	1		
	West Nile Virus (neuroinvasive)	1		

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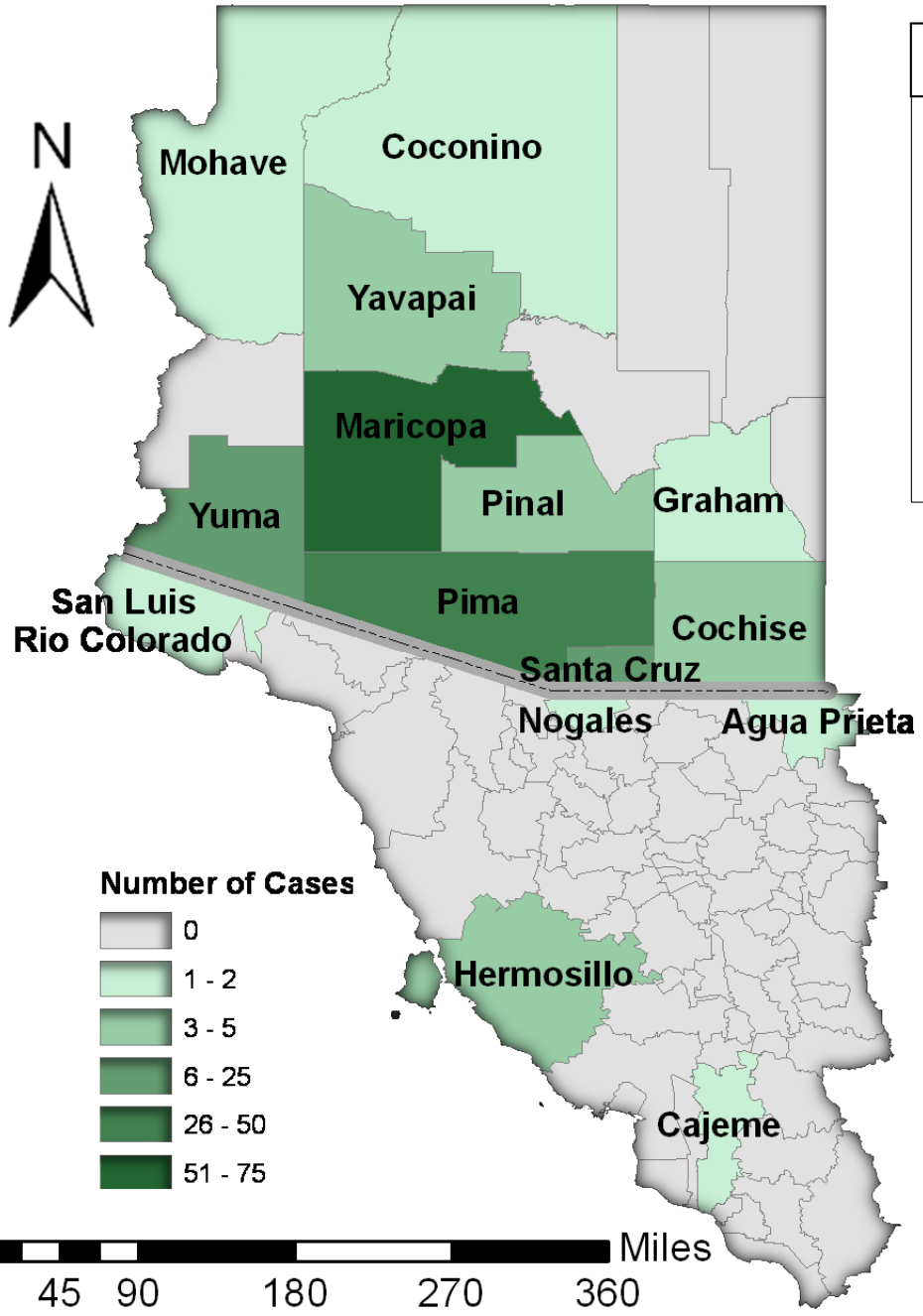
Figure 1: Residency of Binational Cases Reported to Border Health, 2012 (N=172)

By Country of Residence

USA		Mexico	
Arizona	Outside of Arizona	Sonora	Outside of Sonora
155	1	9	7

By County/ Municipality of Residence



Arizona County	Number of cases (n=155)
Cochise	5
Coconino	1
Graham	2
Maricopa	70
Mohave	1
Pima	39
Pinal	5
Santa Cruz	8
Yavapai	3
Yuma	21

Arizona, USA

Sonora, MX

Sonora Municipality	Number of cases (n=9)
Agua Prieta	1
Cajeme	1
Hermosillo	3
Nogales	2
San Luis Río Colorado	2

Figure 2: Characteristics of Binational Cases Reported to Border Health, 2012

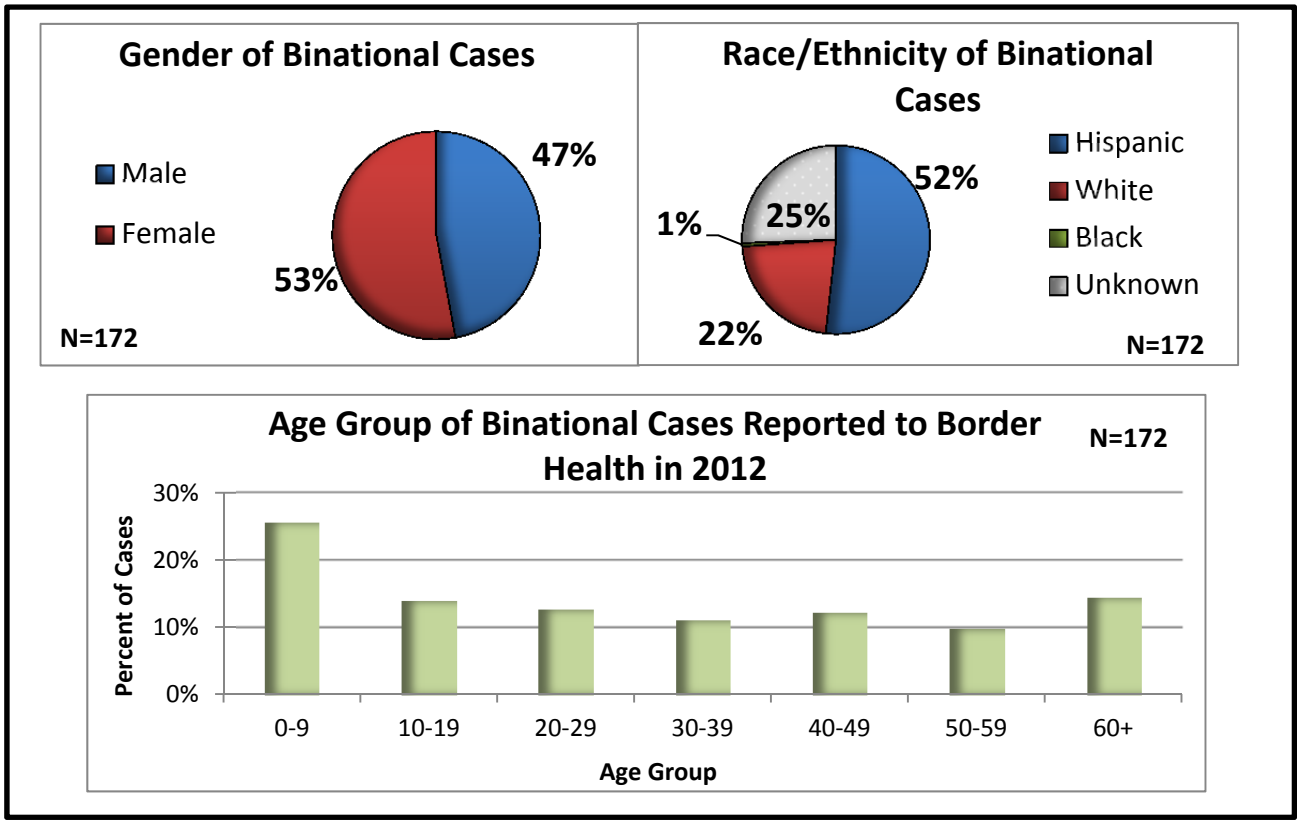
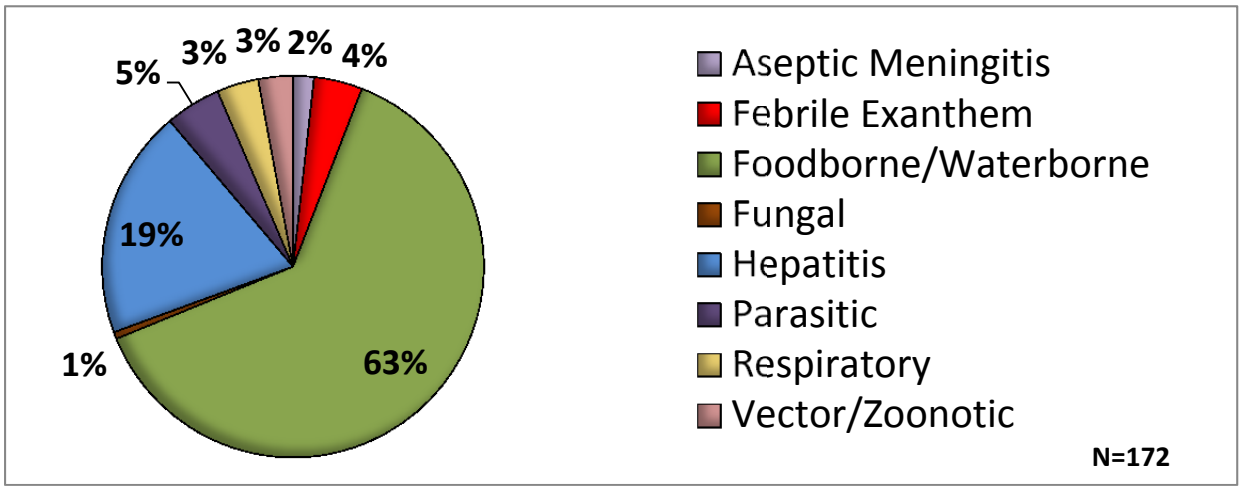


Table 2: Reason for Binational Case Status, 2012 (N=172)

Case Travelled to Mexico	**N**
81% (n=139)	
Travelled to Sonora	79
Travelled to another Mexican state (excluding Sonora)	33
Unknown which part of Mexico case travelled to	27
Resident of Mexico	**N**
9% (n=16)	
Sonoran Resident	10
Resident of another Mexican state (excluding Sonora)	6
Ate food from Mexico[§]	**N**
5% (n=8)	
Food from Sonora	1
Food from outside of Sonora	7
Other	**N**
5% (n=9)	
Contact with a confirmed binational case	3
Contact with Mexican Resident	2
Born in Mexico (unknown location in Mexico)	1
Detained Mexican Resident (unknown which Mexican state of residence)	1
Recent Resident of Mexico (unknown which Mexican state of residence)	1
Sonora Resident During School year	1

[§]without travelling to Mexico

Figure 3: Disease Category* of Binational Cases Reported to Border Health, 2012



The majority of binational cases had a foodborne/ waterborne illness (63%) or hepatitis (19%). For more detailed information on what types of diseases constitute each category, appendix 2.1 lists all of these disease by disease categories. Table 1 lists the number of binational cases diagnosed with each pathology and subtypes (if available), by disease category.

Figure 4: Binational Cases Reported to Border Health by Month of Onset and Disease Category*, 2012

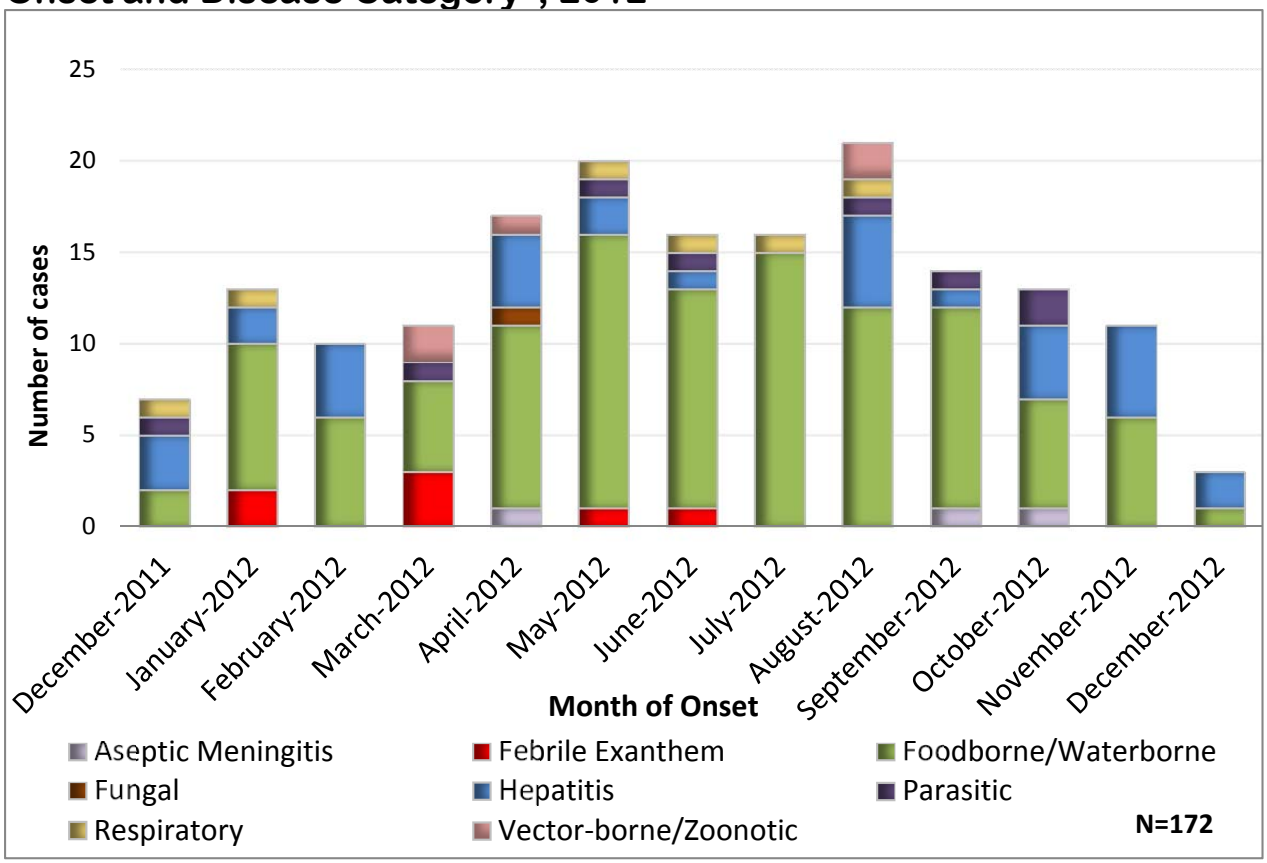


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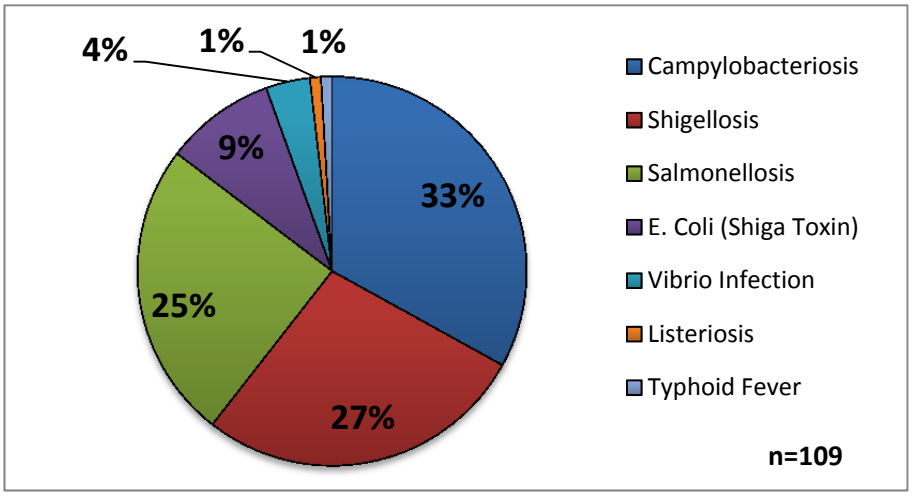
Figure 5: Foodborne or Waterborne Diseases Identified in Binational Cases, 2012



Among cases with a foodborne or waterborne illness, Campylobacteriosis (33%), Shigellosis (27%), and Salmonellosis (25%) were most commonly reported. The subtypes identified for each of these etiologies can be found in Table 1.

Figure 6: Initial Reporting Source of Binational Cases, 2012

Cases are initially reported in MEDSIS through different types of providers or organizations. The majority of binational cases from 2012 have been initially reported into MEDSIS by Hospitals (37%), Laboratories (37%), or Electronic Lab Reporting (17%). Other types of organizations that have reported these cases are: Correctional Facilities, the Sonoran Health Department, AZ County Health Departments, MD Office/Clinics, ED/Urgent Care Clinics, or Schools.

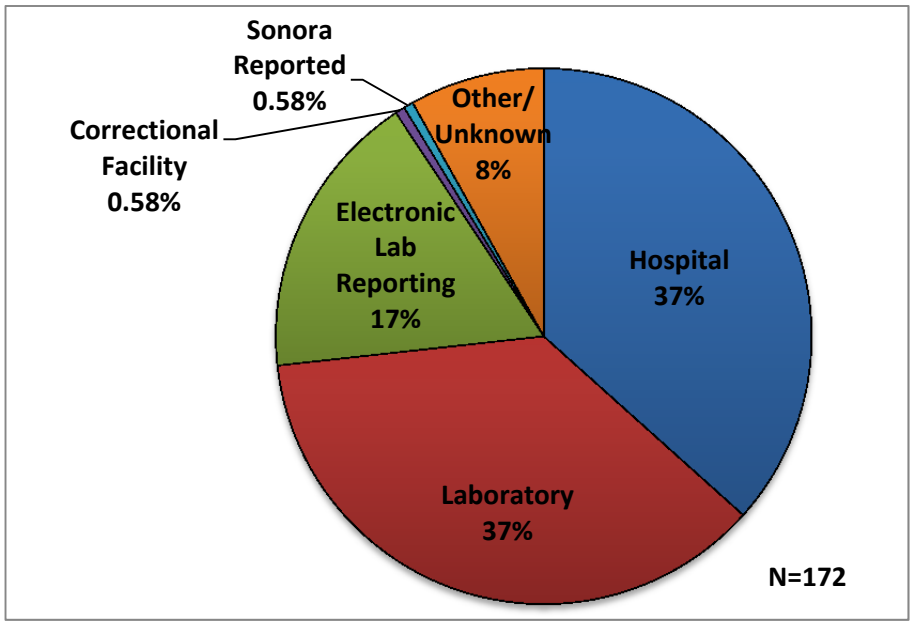
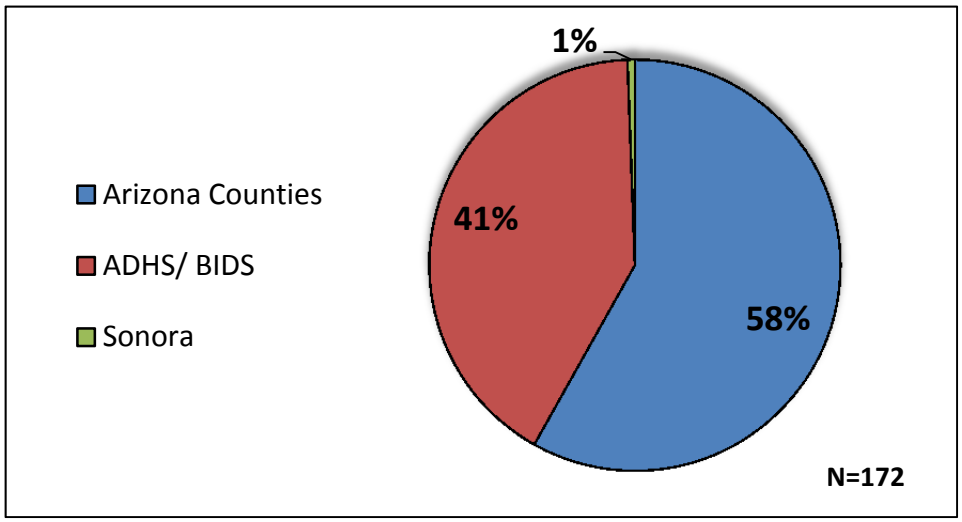


Figure 7: Public Health Agency Identifying Cases as Binational, 2012

BIDS mainly relies on local health department epidemiology staff to flag binational cases using MEDSIS after conducting investigations for cases in their jurisdiction. However, BIDS additionally runs a report of all possible binational cases in MEDSIS searching for cases with Mexican residency and/or cases that have Mexico keywords in the appropriate MEDSIS text fields. Among all binational cases, 58% were flagged by local health departments; BIDS staff was responsible for identifying 41% of binational cases; Sonora epidemiology staff alerted BIDS to 1% of all binational cases. In addition, the Sonora Health Department regularly shares public health notifications of various outbreaks or important diseases identified in the Sonora border region.



Appendix A: Methods: Reporting Pathways

Reporting occurs in the following manner:

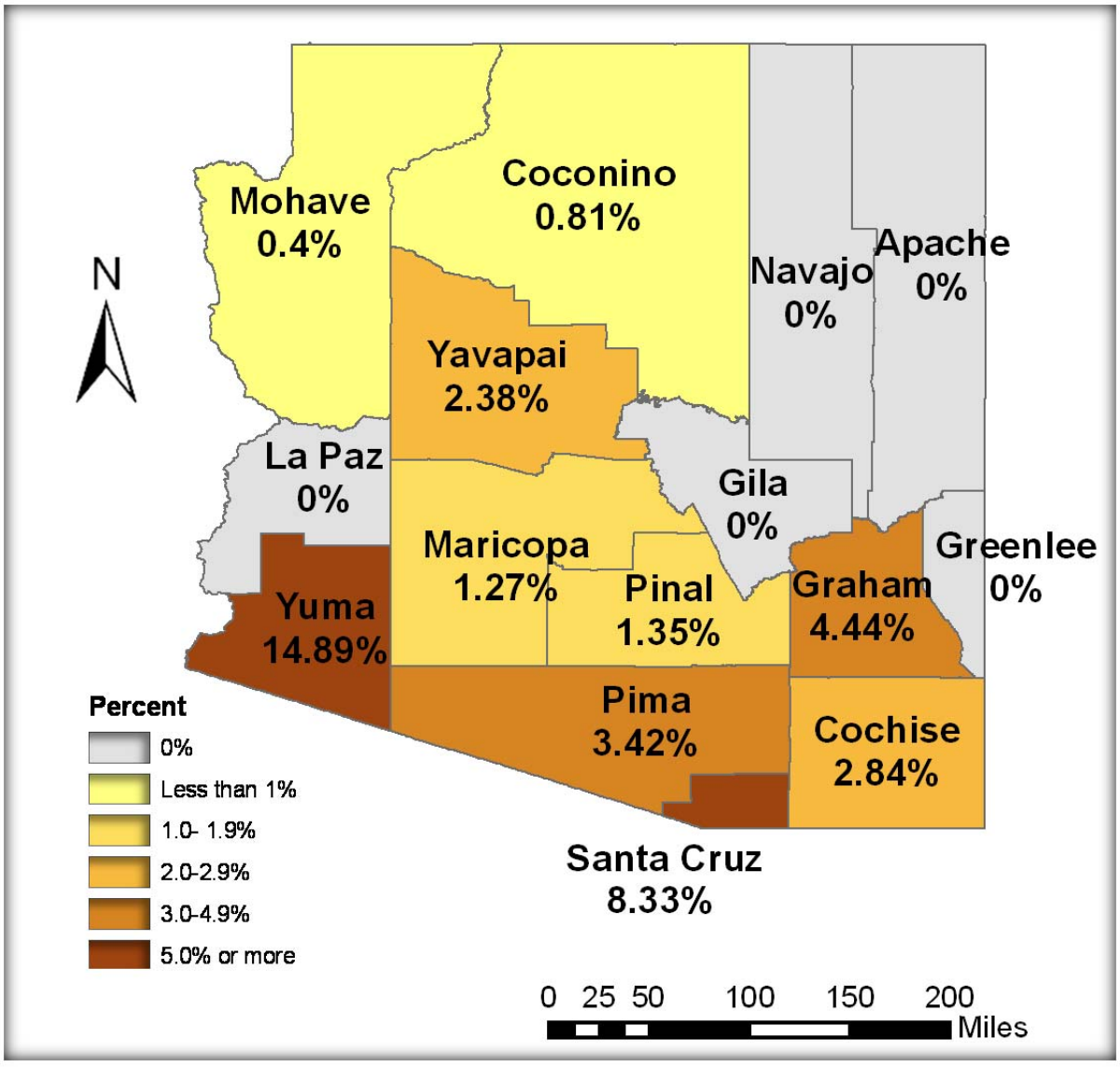
1. Cases are flagged as binational cases using MEDSIS by local health department epidemiology staff after conducting investigations for cases in their jurisdiction.
2. ADHS and BIDS staff are notified through email when binational cases are flagged and then conduct case reviews to confirm binational case status.
3. If there is conflicting evidence regarding binational case status, BIDS staff communicates with the appropriate county department to verify binational case status.
4. Additionally, BIDS runs a report of all possible binational cases in MEDSIS searching for cases with Mexican residency and/or cases that have Mexico keywords in appropriate text fields.

Forwarding to the appropriate authorities:

1. If exposure or travel occurred within the state of Sonora, BIDS epidemiologists share the case through MEDSIS with public health officials from Sonora. If the case is a resident of Sonora, the case is transferred to Sonora's jurisdiction in MEDSIS.
2. If exposure or travel occurred outside of Sonora, but within the country of Mexico, the BIDS liaison forwards to CDC DGMQ who communicates the information to Mexico at the federal level if necessary.

Appendix B: Additional Analyses

Figure 8: Proportion of Binational Cases among all Arizona Reported Cases (excluding Coccidioidomycosis cases) by County of Residence, 2012

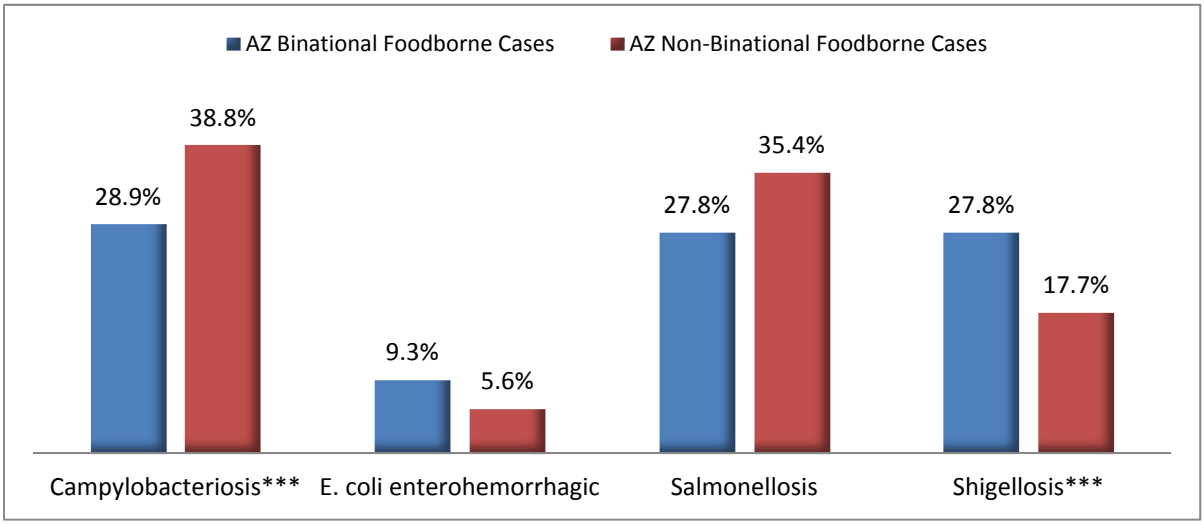


Since Arizona coccidioidomycosis cases are not investigated about previous history/ past exposures and subsequently no data is available regarding binational status, a subset consisting of all non-coccidioidomycosis 2012 cases reported to ADHS was created. From this subset, the proportion of binational cases was calculated by county of AZ residence. Table 3 (next page) corresponds to this map.

Table 3: Proportion of Arizona resident binational cases among all reported infectious disease cases (probable and confirmed), excluding coccidioidomycosis cases

County	All Arizona residents with reportable infectious diseases, excluding coccidioidomycosis (N)	All Arizona resident binational cases with reportable infectious diseases, excluding coccidioidomycosis (N)	Percent of binational cases (%)
Yuma	141	21	14.9%
Santa Cruz	84	7	8.3%
Graham	45	2	4.4%
Pima	1112	38	3.4%
Cochise	141	4	2.8%
Yavapai	126	3	2.4%
Pinal	370	5	1.4%
Maricopa	4952	65	1.3%
Coconino	123	1	0.8%
Mohave	251	1	0.4%
Navajo	158	0	0.0%
Apache	143	0	0.0%
Gila	93	0	0.0%
La Paz	22	0	0.0%
Greenlee	10	0	0.0%
Total	***7771***	***147***	***1.9%***

Figure 9: Comparison of Binational Cases vs. Non- Binational Cases with Foodborne or Waterborne Diseases, Arizona residents, 2012



Two groups of Arizona residents were identified from cases that were diagnosed with Foodborne and Waterborne pathogens[Ω]: Arizona binational cases (travel history or exposure to Mexico) and Arizona non-binational cases (no travel history or exposure to Mexico). The proportion of the most common enteric diseases (Campylobacteriosis, E.coli enterhemorrhagic, Salmonellosis, and Shigellosis) were calculated among these two subgroups and compared using chi-square. Shigellosis was found to be statistically associated with binational cases, being reported more frequently in binational foodborne cases (26.3%) than non- binational foodborne cases (17.8%). Conversely, Campylobacteriosis was found to be statistically associated with non-binational cases, being reported more frequently in non-binational foodborne cases (38.8%) than binational foodborne cases (28.9%). The corresponding table to this figure can be found below in table 4.

Table 4: Comparison of Binational Cases vs. Non- Binational Cases (probable and confirmed) with Foodborne or Waterborne Diseases, Arizona residents, 2012

Foodborne/ Waterborne Disease	AZ Binational Cases (N=97)		AZ Non-Binational Cases (N=2353)		p-value
	(N)	(%)	(N)	(%)	
Campylobacteriosis***	28	28.9%	912	38.8%	*0.0496****
E. coli enterohemorrhagic	9	9.3%	132	5.6%	*0.1284*
Salmonellosis	27	27.8%	832	35.4%	*0.1280*
Shigellosis***	27	27.8%	417	17.7%	*0.0113****
Other foodborne/ waterborne illnesses	6	6.2%	60	2.5%	*N/A*

**** Statistically significant at p-value < 0.05.*

[Ω]Campylobacteriosis, E.coli enterhemorrhagic, Salmonellosis, and Shigellosis are the most commonly reported Foodborne and Waterborne illnesses. Other foodborne/waterborne illnesses reported to ADHS in 2012 were: Botulism, Hemolytic Uremic Syndrome, LIsteriosis, Typhoid fever, Vibrio Infection. Parasitic infections causing diarrheal symptoms (Amebiasis, Cryptosporidiosis, Cyclospora, and Giardiasis) as well as Vector-borne infections causing diarrheal symptoms (Brucellosis and Q fever) are not included in this report's foodborne and waterborne illnesses disease category.